IN THE CLAIMS

1. (currently amended) A doped aluminum oxide layer, comprising:
an aluminum oxide layer having pores on a surface; and
a dopant material filling the pores;
wherein the dopant material is selected from the group consisting of silicon, zirconium, hafnium and titanium; and
wherein the presence of dopant material below the surface is confined to the pores~~is applied to the aluminum oxide layer subsequent to a formation of the aluminum oxide layer such that the dopant material is not dispersed throughout the aluminum oxide layer~~.

2. (currently amended) A doped aluminum oxide layer, comprising:
an aluminum oxide layer having pores on a surface; and
a dopant material filling the pores;
wherein the dopant material is selected from the group consisting of silicon, zirconium, hafnium and titanium;
wherein the dopant material is applied to the aluminum oxide layer subsequent to a formation of the aluminum oxide layer such that the dopant material is not dispersed throughout the aluminum oxide layer; and
~~The doped aluminum oxide layer of claim 1,~~ wherein the aluminum oxide layer further includes voids below the surface and wherein the voids are free of the dopant material.

3. (original) The doped aluminum oxide layer of claim 1, wherein the aluminum oxide layer is formed by a method selected from the group consisting of thermal evaporation, electron-beam evaporation and ion-beam-assisted deposition.

4. (original) The doped aluminum oxide layer of claim 3, wherein a degree of porosity of the aluminum oxide layer is controlled during formation of the aluminum oxide layer using a method selected from the group consisting of ion bombardment and plasma activation.

5. (original) The doped aluminum oxide layer of claim 3, wherein a degree of porosity of the aluminum oxide layer is controlled by bombarding the surface of the aluminum oxide layer with oxygen ions during formation.

6. (original) The doped aluminum oxide layer of claim 1, wherein the aluminum oxide layer has a packing density between approximately 0.65 and 0.999.

7. (original) The doped aluminum oxide layer of claim 1, wherein the aluminum oxide layer has a packing density between approximately 0.85 and 0.999.

8. (original) The doped aluminum oxide layer of claim 1, wherein the dopant material constitutes approximately 0.1% to 30% by weight of the doped aluminum oxide layer.

9. (original) The doped aluminum oxide layer of claim 1, wherein the dopant material constitutes approximately 0.1% to 10% by weight of the doped aluminum oxide layer.

10. (original) The doped aluminum oxide layer of claim 1, wherein the aluminum oxide layer has a degree of porosity such that the dopant material filling the pores of the aluminum oxide layer constitutes approximately 0.1% to 30% by weight of the doped aluminum oxide layer.

11. (original) The doped aluminum oxide layer of claim 1, wherein the aluminum oxide layer has a degree of porosity such that the dopant material filling the pores of the aluminum oxide layer constitutes approximately 0.1% to 10% by weight of the doped aluminum oxide layer.

12. (original) The doped aluminum oxide layer of claim 1, wherein the dopant material is blanket deposited on the aluminum oxide layer.

13. (original) The doped aluminum oxide layer of claim 12, wherein excess dopant material is removed from the surface of the aluminum oxide layer.

14. (original) The doped aluminum oxide layer of claim 13, wherein removing the excess dopant material comprises exposing the excess dopant material to an ion beam.

15. (original) The doped aluminum oxide layer of claim 14, wherein exposing the excess dopant material to an ion beam further comprises exposing the excess dopant material to a beam of argon ions.

16. (original) The doped aluminum oxide layer of claim 12, wherein the dopant material is silicon formed by a chemical vapor deposition using dilute silane in nitrogen and a substrate temperature of approximately 300°C to 350°C.

17. (original) The doped aluminum oxide layer of claim 12, wherein the dopant material is deposited to a thickness less than or equal to an average diameter of the pores.

18. (currently amended) A doped aluminum oxide layer, comprising:

an aluminum oxide layer having pores on a surface, wherein the aluminum oxide layer is formed using an evaporation physical vapor deposition technique; and

a dopant material filling the pores;

wherein the dopant material is selected from the group consisting of silicon, zirconium, hafnium and titanium; and

wherein the presence of dopant material below the surface is confined to the pores~~is applied to the aluminum oxide layer subsequent to a formation of the aluminum oxide layer such that the dopant material is not dispersed throughout the aluminum oxide layer~~.

19. (original) The doped aluminum oxide layer of claim 18, wherein a degree of porosity of the aluminum oxide layer is controlled during formation of the aluminum oxide layer

using a method selected from the group consisting of ion bombardment and plasma activation.

20. (original) The doped aluminum oxide layer of claim 18, wherein the aluminum oxide layer has a packing density between approximately 0.65 and 0.999.

21. (original) The doped aluminum oxide layer of claim 18, wherein the dopant material constitutes approximately 0.1% to 10% by weight of the doped aluminum oxide layer.

22. (original) The doped aluminum oxide layer of claim 18, wherein the aluminum oxide layer has a degree of porosity such that the dopant material filling the pores of the aluminum oxide layer constitutes approximately 0.1% to 30% by weight of the doped aluminum oxide layer.

23. (original) The doped aluminum oxide layer of claim 18, wherein the dopant material is blanket deposited on the aluminum oxide layer.

24. (original) The doped aluminum oxide layer of claim 23, wherein excess dopant material is removed from the surface of the aluminum oxide layer.

25. (original) The doped aluminum oxide layer of claim 23, wherein the dopant material is deposited to a thickness less than or equal to an average diameter of the pores.

26. (currently amended) A dielectric layer, comprising:
an aluminum oxide layer having pores on a surface; and
a second dielectric material embedded in the pores of the aluminum oxide layer;
wherein the second dielectric material is formed of a dopant material selected from the group consisting silicon, zirconium, hafnium and titanium; and
wherein the presence of dopant material below the surface is confined to the pores~~is embedded in the pores of the aluminum oxide layer after formation of the aluminum oxide layer, such as not to disperse the dopant material throughout the~~

~~aluminum oxide layer~~, and the dopant material is ~~subsequently~~ converted to a dielectric form selected from the group consisting of an oxide form and a nitride form.

27. (currently amended) <u>A dielectric layer, comprising:</u>
<u>an aluminum oxide layer having pores on a surface; and</u>
<u>a second dielectric material embedded in the pores of the aluminum oxide layer;</u>
<u>wherein the second dielectric material is formed of a dopant material selected from the group consisting silicon, zirconium, hafnium and titanium;</u>
<u>wherein the dopant material is embedded in the pores of the aluminum oxide layer after formation of the aluminum oxide layer, such as not to disperse the dopant material throughout the aluminum oxide layer, and the dopant material is subsequently converted to a dielectric form selected from the group consisting of an oxide form and a nitride form; and</u>
~~The dielectric layer of claim 26,~~ wherein the aluminum oxide layer further contains voids below the surface and wherein the voids are free of the second dielectric material.

28. (original) The dielectric layer of claim 26, wherein the aluminum oxide layer is formed by a method selected from the group consisting of thermal evaporation, electron-beam evaporation and ion-beam-assisted deposition.

29. (original) The dielectric layer of claim 28, wherein a degree of porosity of the aluminum oxide layer is controlled during formation of the aluminum oxide layer using a method selected from the group consisting of ion bombardment and plasma activation.

30. (original) The dielectric layer of claim 28, wherein a degree of porosity of the aluminum oxide layer is controlled by bombarding the surface of the aluminum oxide layer with oxygen ions during formation.

31. (original) The dielectric layer of claim 26, wherein the aluminum oxide layer has a packing density between approximately 0.65 and 0.999.

32. (original) The dielectric layer of claim 26, wherein the aluminum oxide layer has a packing density between approximately 0.85 and 0.999.

33. (original) The dielectric layer of claim 26, wherein the dopant material embedded in the pores constitutes approximately 0.1% to 30% by weight of the dielectric layer.

34. (original) The dielectric layer of claim 26, wherein the dopant material embedded in the pores constitutes approximately 0.1% to 10% by weight of the dielectric layer.

35. (original) The dielectric layer of claim 26, wherein the aluminum oxide layer has a degree of porosity such that the dopant material embedded in the pores constitutes approximately 0.1% to 30% by weight of the dielectric layer.

36. (original) The dielectric layer of claim 26, wherein the aluminum oxide layer has a degree of porosity such that the dopant material embedded in the pores constitutes approximately 0.1% to 10% by weight of the dielectric layer.

37. (original) The dielectric layer of claim 26, wherein the dopant material is blanket deposited on the aluminum oxide layer and subsequently treated to convert the dopant material to its dielectric form.

38. (original) The dielectric layer of claim 37, wherein excess dopant material is removed from the surface of the aluminum oxide layer prior to converting the dopant material to its dielectric form.

39. (original) The dielectric layer of claim 38, wherein removing the excess dopant material comprises exposing the excess dopant material to an ion beam.

40. (original) The dielectric layer of claim 39, wherein exposing the excess dopant material to an ion beam further comprises exposing the excess dopant material to a beam of argon ions.

41. (original) The dielectric layer of claim 37, wherein the dopant material contains silicon formed by a chemical vapor deposition using dilute silane in nitrogen and a substrate temperature of approximately 300°C to 350°C, and wherein the silicon of the dopant material is converted to silicon dioxide using rapid thermal annealing in an oxygen-containing atmosphere.

42. (original) The dielectric layer of claim 37, wherein the dopant material is deposited to a thickness less than or equal to an average diameter of the pores.

43. (original) The dielectric layer of claim 26, wherein the dielectric layer is a gate dielectric layer of a field-effect transistor.

44. (original) The dielectric layer of claim 26, wherein the dielectric layer is an intergate dielectric layer of a floating-gate field-effect transistor.

45. (original) The dielectric layer of claim 26, wherein the dielectric layer is a capacitor dielectric layer of a capacitor.

46-87. (canceled)

88. (new) The doped aluminum oxide layer of claim 2, wherein the aluminum oxide layer is formed by a method selected from the group consisting of thermal evaporation, electron-beam evaporation and ion-beam-assisted deposition.

89. (new) The doped aluminum oxide layer of claim 88, wherein a degree of porosity of the aluminum oxide layer is controlled during formation of the aluminum oxide layer using a method selected from the group consisting of ion bombardment and plasma activation.

90. (new) The doped aluminum oxide layer of claim 88, wherein a degree of porosity of the aluminum oxide layer is controlled by bombarding the surface of the aluminum oxide layer with oxygen ions during formation.

91. (new) The doped aluminum oxide layer of claim 2, wherein the dopant material is blanket deposited on the aluminum oxide layer.

92. (new) The doped aluminum oxide layer of claim 91, wherein excess dopant material is removed from the surface of the aluminum oxide layer.

93. (new) The doped aluminum oxide layer of claim 91, wherein removing the excess dopant material comprises exposing the excess dopant material to an ion beam.

94. (new) The doped aluminum oxide layer of claim 93, wherein exposing the excess dopant material to an ion beam further comprises exposing the excess dopant material to a beam of argon ions.

95. (new) The doped aluminum oxide layer of claim 91, wherein the dopant material is deposited to a thickness less than or equal to an average diameter of the pores.

96. (new) The dielectric layer of claim 27, wherein the aluminum oxide layer is formed by a method selected from the group consisting of thermal evaporation, electron-beam evaporation and ion-beam-assisted deposition.

97. (new) The dielectric layer of claim 96, wherein a degree of porosity of the aluminum oxide layer is controlled during formation of the aluminum oxide layer using a method selected from the group consisting of ion bombardment and plasma activation.

98. (new) The dielectric layer of claim 96, wherein a degree of porosity of the aluminum oxide layer is controlled by bombarding the surface of the aluminum oxide layer with oxygen ions during formation.

99. (new) The dielectric layer of claim 27, wherein the dopant material is blanket deposited on the aluminum oxide layer and subsequently treated to convert the dopant material to its dielectric form.

100. (new) The dielectric layer of claim 99, wherein excess dopant material is removed from the surface of the aluminum oxide layer prior to converting the dopant material to its dielectric form.

101. (new) The dielectric layer of claim 100, wherein removing the excess dopant material comprises exposing the excess dopant material to an ion beam.

102. (new) The dielectric layer of claim 101, wherein exposing the excess dopant material to an ion beam further comprises exposing the excess dopant material to a beam of argon ions.

103. (new) The dielectric layer of claim 99, wherein the dopant material contains silicon formed by a chemical vapor deposition using dilute silane in nitrogen and a substrate temperature of approximately 300°C to 350°C, and wherein the silicon of the dopant material is converted to silicon dioxide using rapid thermal annealing in an oxygen-containing atmosphere.

104. (new) The dielectric layer of claim 99, wherein the dopant material is deposited to a thickness less than or equal to an average diameter of the pores.

105. (new) The dielectric layer of claim 27, wherein the dielectric layer is a gate dielectric layer of a field-effect transistor.

106. (new) The dielectric layer of claim 27, wherein the dielectric layer is an intergate dielectric layer of a floating-gate field-effect transistor.

107. (new) The dielectric layer of claim 27, wherein the dielectric layer is a capacitor dielectric layer of a capacitor.